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ABSTRACT

Basic information and references to more detailed information are presented in this guide which is designed to help in establishing a learning environment in which training of individual employees can be carried out in the most economical manner. Aspects of individualized learning systems are discussed and include the following: history and definitions; essential elements of an individualized learning center; determining needs and establishing objectives for a center; designing instruction; selecting and developing materials; validation of courseware; establishing and operating the facility with consideration of site location, facilities, environment, and selecting equipment; staffing the center, quantity of center staff, scheduling, records maintenance, and cost considerations; and evaluation of the center to determine if objectives are being achieved. Appendixes contain a sample set of specifications for planning the facility design, an inventory maintenance record, some considerations for determining needs, a manager-coordinator checklist for evaluating learning center operations, and a trainee checklist for evaluating individual progress in an individualized learning center. A bibliography is included. (TA)

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Individualized Instruction: Establishing and Operating a Center for Self-Paced Learning

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Introduction

Some new training approaches have emerged within the recent past that provide alternatives to group instruction in the form of individualized or self-paced instruction. These techniques which include, among others, computer assisted instruction, programmed instruction, and audio-tutorial methods have contributed to the development of a learning environment which places emphasis on the individual learner.

It is in recognition of these important developments for individualizing employee training that the U.S. Civil Service Commission's Bureau of Training offers this pamphlet about the individualized learning center.

Although the pamphlet focuses on the individualized learning center, it should be stressed that the use of the individualized learning concept is not limited to a "center." It can also be used in an office site. Thus, information provided here can be useful to those who want to use the concept, without undertaking the establishment of a physical facility.

This booklet has a single purpose: To provide some basic information and references to more detailed information in order to help the reader establish a learning environment in which new gains in educational technology can be used for the training of individual employees in the most economical manner.

History

Technology for training has now moved to the fore as an integral factor in the employee training process. This trend began in the early 1960's when language laboratories were established in many public schools and in some Government installations. Generally, these labs contained sophisticated audio and visual equipment. Students were able to learn languages by listening to audio tapes and responding with audioactive tape recorders. Some labs were successful, but most failed for a variety of reasons e.g., poor instructor response, lack of suitable materials, understaffing, poor planning, and breakdown of equipment. Despite these early failures, the trend continued, because the basic concept was sound — the idea of individualized instruction was so attractive that its time was bound to come.

B. F. Skinner and other behaviorist psychologists had also been looking into the "new" instructional technology during the 1950 to 1965 period. Their studies brought about the development of a system of learning in which the trainee progressed step-by-step through a prescribed sequence of material. The learner was held accountable and "rewarded" for performing the required programmed tasks. Through these studies, programmed instruction proved itself to be an effective method of instruction. Unfortunately, however, the newly found interest in programmed learning was misdirected at first. Some efforts went into promoting "gadgets" (hardware) instead of the instructional learning materials (software, courseware) so necessary for training. Experience eventually taught educators and trainers that the quality of the software was more important. When that occurred, programmed instruction came of age.

In recent years, educators and trainers have come to recognize the needs of the individual learner. **Learner** based instruction rather than **teacher** based instruction is now considered essential, because research indicates that people learn at different rates and in different modes. Fortunately these needs and modes of learning can be assisted by utilizing new technologies for training in the individualized learning center environment.

Definitions

Individualized learning systems are designed to treat trainees according to their individual needs. One may consider traditional classroom instruction as teacher based. This learning system depends on the teacher and the teaching style. The learner tends to be **passive.**

The instructor determines the content and the pace of instruction. Dependence on the instructor implies a fixed timetable with lessons usually of equal length. This traditional learning method usually considers the group as an entity whose members have equal learning needs, abilities, rates and responses. Hence, the greatest success in learning tends to be with those groups having similar learning needs, abilities, rates and responses. Experienced instructors know that groups are not generally homogeneous. Research shows that learners differ markedly from one another. They learn in different ways, at different rates, and exhibit different learning needs. Ideally, instruction should take these differences into account.

A technique which recognizes personal learning needs is called individualized instruction.[1] Individualized instruction is designed to treat each trainee as an individual who learns at his own rate. Learners are motivated by having the opportunity to match their individual needs to learning objectives and to progress along the instructional path at their own pace — thus, they have a greater chance of experiencing success in achieving learning objectives. The essential difference between the **teacher based** approach to learning and the **individual** approach to learning lies in the relationship of the learner to the source of instruction. When "I learn" (active), I go to the source of instruction; when "I am taught" (passive), it comes to me.

There is no one approach to individualized instruction, although all individualized instruction has one element in common — the emphasis is placed upon the needs of the individual learner rather than a group (see Figure 1). All configurations of individualized instruction use some form of self-pacing by the student, allowing students to progess until they achieve the objectives determined at the outset.

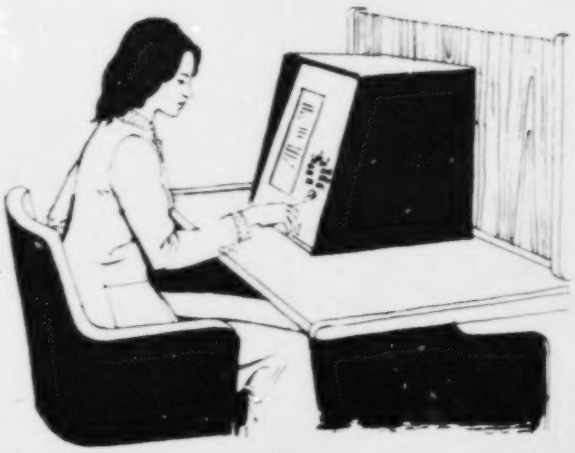
According to the report of the National School Public Relations Association, *Individualization in Schools - The Challenge and the Options*[2] there are four general types of individualized instruction. These are depicted in Figure 1.

Types of Individualized Instruction

Type	Objectives Determined by	Instructional Methods Determined by	Materials Determined by	Pace Set by
Individually designed and prescribed instruction	Instructor	Instructor	Instructor	Trainee
Self directed instruction	Instructor	Trainee	Trainee	Trainee
Personalized instructional programs	Trainee	Instructor	Instructor	Trainee
Independent study	Trainee	Trainee	Trainee	Trainee

Figure 1

For purposes of most Government training, the **self-directed approach** and **independent study programs** do not lend themselves to the development of individualized learning centers as conceived in this guide. In most government training, the instructional methods and materials are determined by the instructor.



Trainee interacting with an automatic response programmed teaching device.

What is an Individualized Learning Center?

A learning environment specially designed to help trainees satisfy their individual learning needs through a variety of media is known as an individualized learning center. In this environment the emphasis shifts from the teacher (live) presenting the material, to the trainee interacting with multiple

media resources (non-live) which present the materials. An individualized learning center is an environment in which trainees have easy access to the learning materials and equipment whereby they may perform the prescribed learning tasks at their own rate. The instructional resources designed to fulfill the learners' objectives are immediately available on demand. The environment we shall consider in this booklet is a set location, or complex of rooms, in a central area designed for the sole purpose of training employees.

Essential Elements

Certain elements are common to most individualized learning centers regardless of their location or the subject matter taught. Six essential elements are found in most learning centers:

1. self-instructional learning "packages" or programs;
2. necessary instructional equipment in a controlled environment where learning can take place;
3. a professional learning coordinator and staff who can guide trainees (after pre-testing programs) in the establishment of trainee learning objectives and the selection of learning materials;
4. flexibility of scheduling activities and student use of the center;
5. analysis of trainee achievements and the maintenance of trainee records;
6. and availability of individual study or work areas.

At the individualized learning center the trainee will be able to follow a prescribed course of study designed to meet specific learning objectives efficiently and economically. It will be a center which provides a multiplicity of learning approaches. It will be a center concerned about helping employees learn what they need to know to carry out their organizations' mission and functions. In addition, it will be a center concerned with the employees' personal training needs in relation to both the organization's mission and advancement in their jobs. The balance of this booklet will deal with these essential elements and show how a center can be established.

Determining Needs and Establishing Objectives for a Center

A learning center should be established only if it is designed to meet clearly identified needs that are recognized by the organization. Initiators, in their enthusiasm, sometimes presume a modern facility with the latest equipment can solve undefined problems. Consequently, new training ventures are sometimes started without sufficiently determining the need for them. The result of such short sightedness is often failure or at a minimum, the acquisition of expensive equipment which is seldom used.

Careful, in-depth identification and analysis of the needs of the organization which might be met through an individualized learning center is an essential first step. Questions relating to the kinds of training needed, the volume of training expected, the characteristics of the proposed trainees (e.g., availability, level of knowledge, level of ability, etc.), their locations in relation to each other, financial and other resources available, lead time available, the comparative advantages and disadvantages of meeting the training through an individualized learning center as compared to other training techniques (e.g., group classroom training, on-the-job coaching, correspondence instruction, etc.), and similar considerations should be scrutinized.

If this analysis confirms the need for an individual learning center, the next step consists of establishing objectives which the center will be designed to serve. Learning centers can be designed to serve a variety of purposes (e.g., to provide current job related training only, to help employees develop themselves for future advancement within or outside the organization, to train supervisors only, to train clerical employees only, etc.). If the needs have been identified and analyzed thoroughly, the setting of objectives is made easier. The objectives, then, must be based on the clearly identified needs.

The objectives should be described, in writing, in terms which specifically state what the center will be designed to do. Careful completion of this step before proceeding further will be of inestimable value to those assigned responsibility for bringing the center into existence and for developing it into a full-fledged, operational facility. The objectives serve as essential guides in creating and operating the center. Below are examples of objectives which might be used in a learning center.

1. To improve employee's competency in the basic skills areas of reading, business mathematics, and English grammar;
2. to improve employee's competency in job related skills areas of typing, dictation, and shorthand;
3. and to improve employee's competency in managerial problem solving skills.

Some observations on financial analysis as it relates to needs and objectives might be helpful. In determining needs and setting objectives, the organization should attempt to gauge economic impact by means of cost/benefit analysis. This publication does not permit a thorough discussion of the economic analysis process. The reader is referred to the publications below which may provide helpful insights into the process.

1. *Economic Analysis Handbook*, Second Edition, Department of Defense, January 1975
2. *Training Cost Model*, U.S. Civil Service Commission, 1972
3. *Training Value Model I*, U.S. Civil Service Commission, 1973

Trainees working together in the small group study area.

Analyses of the comparative costs and benefits of the various approaches to meeting a training need can be extraordinarily valuable in helping an organization determine which method will provide the desired result at the most reasonable cost. The decision to establish a learning center should never be taken lightly as it invariably involves significant resource investments. The decision should always be made in the light of the best possible training needs data as it relates to achieving desired purposes and the costs involved.

Instructional Program

The planner of an individualized learning center must deal with the problem of appropriate instructional design and its suitability to training. The planner must be concerned with the large variety of backgrounds, previous educational experiences, and the training objectives of the various learners attending the center. A specialist should analyze the need for job performance improvement of the learners and make a determination that a learning center approach is the most appropriate.

Designing Instruction

Instruction should be designed to suit the learner. Instruction can be considered suitable when instructional objectives (the knowledges or skills to be taught) are matched with instructional methods.[3] The question of matching is not a simple issue — rather, it is a question of degree. While perfect suitability is rare, the less the suitability for the students, the less they will learn. The planner should give careful study to the major factors involved in designing instruction. These factors include:

1. an assessment of the learners' knowledges, abilities, and deficiencies;
2. the determination of learning objectives for the trainees;
3. a determination of types of learning experiences (i.e., methods to be used — which are best suited to the trainees?);
4. an evaluation process to measure the trainees' progress;
5. and feedback evaluation designed for the improvement of the system.

If possible, the planner should elicit the assistance of a qualified educational technologist and/or curriculum specialist to assist in the design of the instructional program.[4] For a more complete description of the instructional design process the reader is referred to *Applications of a System Approach to Training: A Case Study*.[5]

Selecting and Developing Materials

After instructional objectives are determined, a decision must be made as to the instructional materials best suited to carry out the objectives. Among the factors influencing the selection of courseware the planner should consider the following:

1. qualitative requirements of the instruction;
2. trainee entry levels;
3. time limitations in which instruction must be accomplished;
4. and the manner in which the courseware will be used.

In order to select courseware materials the planner will be able to take several courses of action:

1. purchase ready-made courseware produced by commercial firms (these are commonly called "off-the-shelf" materials);
2. contract with an outside firm or agency to design and/or produce the courseware;
3. design, and/or produce, the courseware using the center's staff;
4. and/or purchase existing courseware designed and produced by another Government agency.

There is no easy method to determine the best option for courseware development. Generally the center has most control over the design and content of instructional materials when they are produced in-house but the costs and time delays of in-house production can be very high as compared to off-the-shelf selection or purchase from other Government agencies. It is recommended that agencies first thoroughly review the many excellent instructional materials already available through commercial sources or Government agencies before an attempt is made to contract for materials and/or produce materials in-house. Those agencies just beginning a center or which have a rather small operation should strongly consider the purchase of ready-made courseware. There are a host of available individualized learning materials in such diverse areas as shorthand skills, typing, management, supervision, problem solving, reading, grammar, mathematics, and statistics. These materials generally have a common application for most government agencies.

The center should consider the following factors in its decision to purchase or prepare in-house:

1. Design of instructional materials-
   Centers producing their own materials or contracting specifically for them are generally able to specify exactly what they need to meet identified objectives. Materials purchased off-the-shelf or from other government agencies may not suit these objectives as well. Often these materials are either designed for the general audience or for a particular

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group not necessarily resembling the centers' trainees.

2. Available equipment-
   Here the center planner must consider the center's equipment capability since many off-shelf materials as well as those produced by other government agencies utilize specialized audiovisual equipment. Consideration must also be given to the learning style as well as physical limitation of trainees. Each of these considerations may require specialized equipment.
3. Availability of materials-
   Available materials will be dependent upon items located in commercial and government catalogues and the supply of items in inventory. Local production of curriculum materials may depend upon the available in-house staff experience and work-load or private contractor delivery schedules.
4. Cost-
   The cost of in-house or contractor supplied materials generally are expensive if used on a small scale and if staff time and equipment are at a premium. Off-the-shelf materials are generally inexpensive by comparison. Items produced by other government agencies are generally less expensive as the cost of development is usually borne by the developing agencies.
5. Validity of instructional materials-
   Here local in-house or private contract purchase lends the center most control over valid and consistent courseware. Many private, off-the-shelf vendor materials have been validated although the center planner should consider these validation claims in light of specific needs.

Individualized instruction can be considered one technique of matching instruction to the needs, preferences, and abilities of the learner. Trainees have many styles of learning. The variety of courseware available to the learner should, therefore, be wide. Curriculum areas will quite often require courseware covering the same material but presented in different configurations, e.g., programmed text, sound slide/filmstrip, cassette tape, film loop, etc. The decision of which methods are best suited will depend upon the desired outcome, the learners' knowledge, abilities and styles, and cost/benefit considerations. For example, an individual who must learn a particular skill may not have high reading ability. Courseware designed around the ability to comprehend the written page will not suit this individual. One alternative is the use of an audio, visual or audiovisual mode of instruction. In courses designed for students with little verbal ability, non-verbal techniques may be considered. Individuals with more reading ability, for instance, may be able to learn best using programmed text material. Course material in different media formats and/or approaches using different learning techniques should be available. As much variety as economically possible should be available in the center to adequately satisfy the needs of the trainee population.[6]

Validation of Courseware

An important function often overlooked by center administrators is the validation of courseware. Validation is a process of testing and revising instructional strategies and materials to be certain that the instructional intent is achieved. Validation is a separate step in the instructional design process and should not be confused with evaluation. Evaluation will be discussed in another section of this publication.

The process of courseware validation is usually time consuming but is critically important. The effort made will yield significant dividends in more efficient and effective instruction. The validation process basically consists of five steps:

1. instruction is designed and delivered to a representative sample group of trainees;
2. instruction is tested against performance objectives;
3. problems arising from the test are analyzed;
4. courseware deficiencies are corrected and courseware is revised;
5. and the process is repeated until the courseware is validated according to the performance objectives, trainee population, and other criteria involved.

Is the courseware doing what it was designed to do, i.e., can the trainees who have passed through the system perform the tasks that were identified? This is the key question of validation. When the answer to this basic question is "no", revision and retesting of the courseware is necessary. Validation is specific in its direction, systematic in its method, quantifiably measurable, and can be documented for future reference and adjustment. The reader is referred to the U.S. Air Force publication *Handbook for Designers of Instructional Systems*, Volume IV, and Department of Defense publication *Interservice Procedures for Instructional Systems*

Development, (see Bibliography) for a more detailed description of the validation process.

Ideally, courseware should be validated using a learner population for which the materials were designed, although this may not always be feasible. When off-the-shelf courseware is considered, producers should be able to supply the center with validation data on their product. This data should be reviewed with consideration given to application in the particular center. Many off-the-shelf materials may be previewed prior to purchase. This will give the center time for self-validation before costly purchases are made. If the materials are found unsuitable they can be returned.[7]

Improving typing skills with specialized equipment.

Establishing and Operating the Facility

What should a learning center look like? How should a center operate? Unfortunately, there are no standard answers to these questions. The facility design will be dictated by the instructional requirements, site characteristics, trainee population and budgetary restraints. (See Figure 2).

Defining the requirements for a facility can be time consuming and often frustrating. Those who believe that blueprints can be drawn and construction started before adequate detailed planning, have a short-sighted approach that often leads to a poorly designed facility. As each center should be designed to meet needs peculiar to it, only general guidelines and suggestions for inclusion in a "typical" center can be offered here. This chapter is designed to provide such guidance. (See Appendix I).

Facility Design

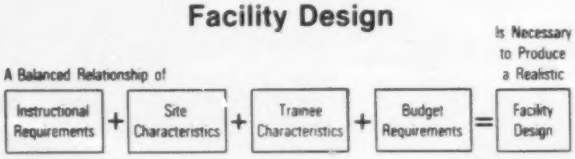

Figure 2.

Site Location

Trainees will be more willing to use a center if it is easily accessible. Successful centers are usually found within easy walking distance of the learner's work location. Careful consideration should be given to choosing an appropriate site location as the costs and hours expended in travel to a center distant from the work area can pose many problems.[8]

Facilities

The actual size of the local center will depend upon several factors. Among these are:

1. **Individual learning areas.** Individual learning areas usually consist of study carrels. A study carrel is a small booth in which all necessary instructional equipment and program materials are placed. The trainee performs individual learning tasks in the carrels. Other types of individual study areas will conform to the particular training task, i.e., work bench for electronics repair or data processing card punch machine for card punch skill training.[9] The amount of space required will depend upon the nature of the task. As a guide in planning space apportionment, a standard study carrel will utilize approximately 12 sq. feet. This includes the carrel and chair space as well as passage area for physical movement of trainees.[10]

Trainee utilizing a written response programmed teaching device.

2. **Small group learning areas.** Often, training will require small group participation. Commonly, the small group space should be off the main learning area in a closed room. The room may be designed so that users can exit without entering the individual learning area. This will reduce the noise level as well as traffic flow congestion.
3. **Storage area.** An individualized learning center will, by its very nature, have many learning packages and equipment. A well ventilated, uncluttered storeroom is essential. The storage room should be immediately accessible to the learning area.
4. **Reception and lobby area.** A trainee's first impression of the learning center will come from the lobby-reception area. Trainees should be welcomed in an open, cheerful, colorful, uncluttered area. Comfortable furniture should be available in this area as well as leisure and job related reading materials. The lobby should be away from the main study areas so individual trainees will not be distracted.

Learning Center Layout

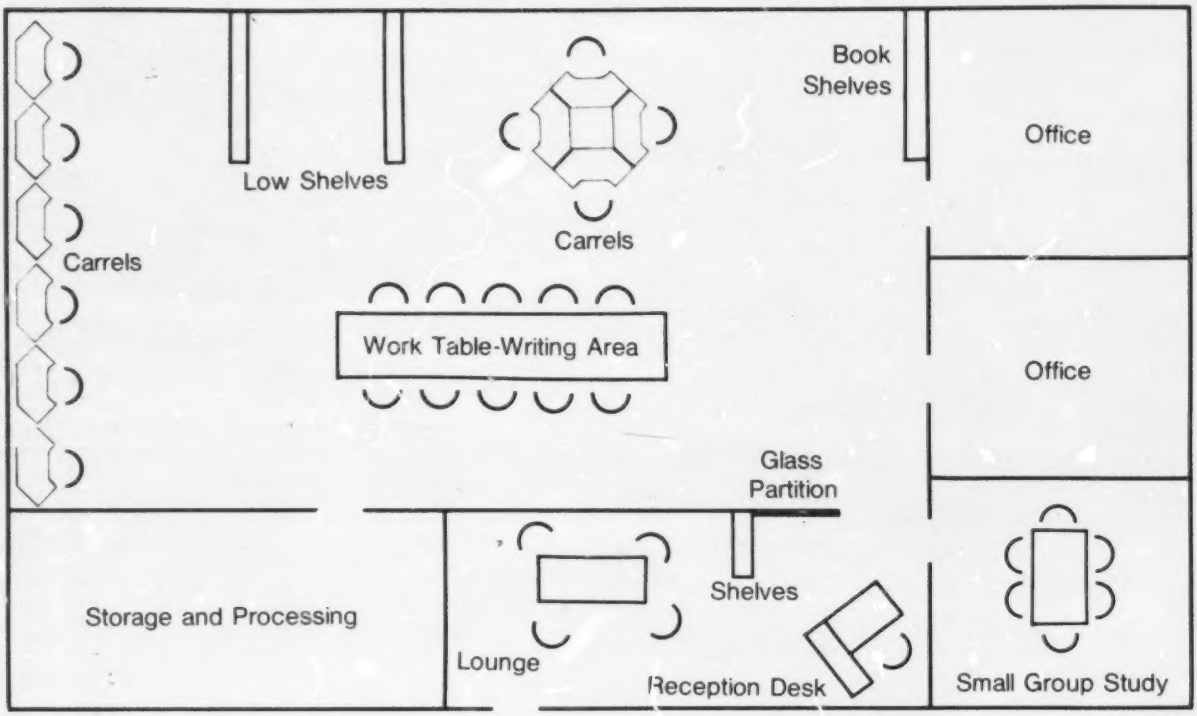

Figure 3

5. **Office space.** The center director as well as the various counselors should be provided with adequate office space. The counseling office should be situated in such a way that outsiders are unaware of the c unseling session in progress. If at all possible a conference room should be included in the learning center office area for group meetings of center staff.
6. **Media production and equipment servicing area.** The courseware design and production facility may be associated with other training components of the organization but if the learning center is to be designed for in-house course design and production, then those facilities should be provided for. The design and production facility should be away from the main learning area in order to keep noise and other distractions away from the individual learning space. This area should contain running water and dark room facilities because of the special requirements of certain media production processes. Sufficient work space should be considered for the specialized equipment as well as a graphic arts area.[11] (See Figure 3).

Environment

Training should be conducted in an atmosphere conducive to learning. Not only should space be adequate, it should be comfortable, attractive and serve human needs. (See Figure 4) In planning the learning center, consideration should be given to the following:

1. **Lighting.** Lighting will assist in providing a pleasant and attractive environment as well as provide functional support for the various center activities. Lighting levels and types will vary depending upon the learning task being performed. Lighting "quality" for particular tasks instead of general lighting "quantity" should be considered. For example, each study carrel should have a student operated florescent light. This light may then be adjusted to fit the learning conditions of reading or the use of multi-media equipment. Equipment usually does not require supplementary lighting since it often contains its own illumination.

   One should not confuse lighting intensity with brightness, as discomfort may be sensed

due to the latter rather than the former. A design approach utilizing a lower overall intensity of lighting, may result in a more economical, functionally effective, interesting and attractive quality of lighting.[12]

Controlling the Environment

Figure 4

2. **Climate Control.** The heating-ventilating-air conditioning (HVAC) system should be designed for human comfort as well as for proper maintenance of instructional equipment and materials. The planner should consider the quantity of equipment generating heat. Provision for proper ventilating/cooling devices specifically designed for reducing equipment heat should be planned.

   Adequate ventilation should be provided not only to maintain a satisfactory thermal environment, but to minimize air pollution. Dust and dirt can be a problem for the smooth and efficient operation of audiovisual equipment as well as the software utilized in the various devices. In dry areas humidity control devices should be included in the climate control system. An efficiently designed HVAC system will make a significant contribution to the effectiveness of the trainee and of the center staff. The HVAC system is not merely a luxury, as it will pay for itself in increased productivity.
3. **Carpeting.** Carpeting serves various purposes. It can be pleasing to the eye and reduce the noise level in the learning center. It is also easy to maintain. Psychologically, carpeting promotes a warm feeling for the learner. Industrial grade carpet should be used as it will take constant wear.
4. **Acoustics.** Of all environmental problems, acoustical problems are possibly the most recurring and difficult to solve. Research has shown the need for trainees to be able to concentrate in a learning center situation.[13] Intermittent speech or intermittent mechanical noise is extremely annoying when one is trying to concentrate quietly and intensely for prolonged periods of time. A general low level of background noise may not be objectionable until it begins to assume such prominence as to create communication problems. The treatment of sound within a space is as important as sound transmission between adjacent spaces. Excessively high noise levels may be attributed, for example, to loud air-handling systems and mechanical noise or sound bouncing off concrete walls. Consideration of all factors plus a thoughtful balance between background noise and openness of space, and the availability of acoustically private spaces would seem to provide the most viable environment.

   Various devices are available for reducing unwanted acoustical interference. These may include such items as carpet floor coverings, low acoustically treated ceilings, fabric curtains on the windows and/or walls, and audiovisual equipment installed with "silent" motors and fans. The traffic flow pattern of the center can also be designed to reduce the noise level. Acoustical standards for learning

Comfortable study carrel with an automatic teaching device.

center type environments should be referred to by the learning center planner.[14] Provision for control of acoustic conditions within the room and the exclusion of noise from sources outside the room should be made.

5. **Aesthetic Considerations.** The learning center should not only be functional but it should create a pleasant environment in which to work. Beauty may be enhanced by an appropriate use of lines and color in the design and furnishings. As mentioned above, carpeting will add beauty and comfort to the center. The choice of room color will have important aesthetic effects--in addition, the choice of colors may also have an important psychological effect on the trainee and center staff.[15]

Selecting Equipment

Because of the nature of individualized learning, many types of multimedia equipment will be found in an individualized learning center. The type of equipment chosen must be appropriate for the instructional objectives and courseware configuration. Careful attention must be given to choice, as the wrong decision may cause many wasted dollars and possibly ineffective instruction.

The planner should determine the need for standardization of equipment in the center. This is especially important in establishing a learning center which will be part of a network of centers.

The need for standardization of equipment is based on several factors:

1. Compatability and availability of software should be determined. Quite often, particular software may work only in the manufacturer's device. The choice of such material should be given careful consideration as to its instructional value as well as its cost effectiveness.
2. The ability to produce courseware on the local level should be considered. Software produced locally should have a configuration suitable to the hardware available.
3. Maintenance is an important factor in choosing equipment. Standardization will facilitate repair and the purchase of spare parts i.e., bulbs, belts, etc.
4. Compatability as to industry and Government standards is also an important factor. The television tape recorder manufacturers have, for example, created minimum specifications for ½" videotape recorders. This standard, known as EIAJ-1[16] will permit software to be used interchangeably with all other machines conforming to that standard. The prime consideration should be compatability between learning centers and modes of instruction.

The planner must also determine the quantity of equipment purchased as well as the type. A center with 10 study stations will not necessarily need 10 audio tape players. Even if all stations were active simultaneously not all software requires audio players. Much audiovisual equipment is light enough to be portable (cassette tape players, slide viewers, etc.) therefore sharing or rotating equipment among learning stations is feasible. For example, in a 10 student station center, one student may be utilizing a controlled reading device, two students may be utilizing a typewriter and cassette tape player, and four trainees may be working on shorthand skills by using a cassette player. Another trainee may be using a programmed teaching machine, while two more trainees may be learning from a sound/slide viewing machine. The quantity of equipment will depend upon the size of the center, the configuration and quantity of the courseware, student load, as well as budgetary requirements.

Learning center furniture varies in style according to functional design. Probably the most prevalent piece of furniture is the study carrel. A study carrel is a booth with three enclosed sides. The instructional hardware used in a carrel may either be permanently installed or be portable. Carrels may be "wet" or "dry". The wet carrel is one in which electric power is attached for use with audiovisual equipment. (See Fig. 5) It is suggested that the carrel be no less than 35" wide by 22" deep. The partition separating the carrels should be no less than 21" above the work surface. The carrel should have a narrow shelf approximately 8" wide and 5" from the top of the partition. A wet carrel should have at least a two outlet, three pronged, AC socket as well as a light underneath the shelf. When TV is utilized in the center, the carrel should have space for a TV monitor or a separate carrel designated exclusively for TV use may be provided. If the video tape player is not wired centrally, then the carrel should incorporate a video cassette player. The carrel should be a comfortable place to work and study.

Storage furniture such as shelving, and cassette tape storage cases, will also be an important segment of the center. As instructional materials packages often come in odd configurations, storage equipment should be properly designed for safety and accessibility. Many centers store the bulk of their courseware out of view of the student in or-

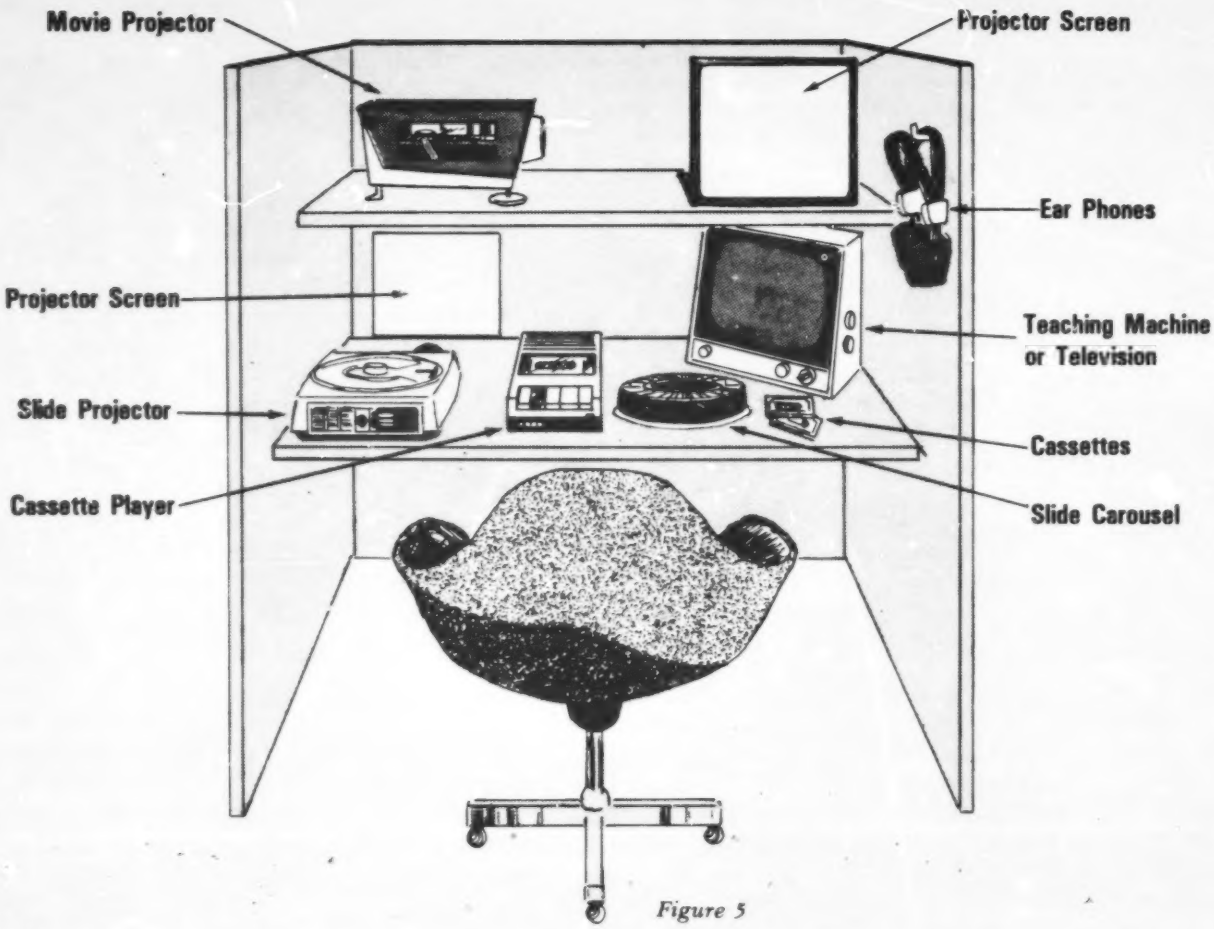

Figure 5

der not to overwhelm the new learner. Modern storage equipment is quite attractive and can be ordered in various colors. Other furniture will consist of work benches or work tables suitable to particular learning situations, comfortable chairs, and a lounge area designed for relaxation.

Staffing the Center

Providing the center with adequate staffing is essential. Unless the center is very small it is not satisfactory to staff it with a part-time administrator whose attention is divided between the center and other duties. Nor is it sufficient to assign the administration of the center to non-professional personnel who simply check trainees in and out and keep records.

To function effectively, a center must be staffed with personnel who can perform a variety of essential functions. Some of those functions relate to trainee needs. For example, trainees need help in deciding what courses are appropriate for them considering their capabilities and background; they need help in determining what prerequisites might be appropriate for them; some need help as to how they should proceed in trying to reach their career objectives; others need help in identifying their career objectives. Trainees must be tested, their scores must be interpreted, and the trainees must be counseled regarding the results.

In addition, to providing help to trainees, someone must determine what additional courses should be acquired or developed; and what kind of equipment should be purchased. Training materials must be validated. These are but a sample of the functions involved in the operation of a quality individual learning center. And, of course, the larger and the more sophisticated the center, the greater the need for more capable professional personnel.

No individualized learning center can be a thriving enterprise, responsive to the needs of trainees, without adequate staffing. Of course, the size of

the staff and the kinds of qualifications they need depends on a number of factors, e.g., the size of the center, the kind of program it offers, the nature of its clientele, whether or not it designs and develops its own programs, etc.

The following summarizes the kinds of functions normally found in an individualized learning center:

1. General supervision of center operations
2. Trainee counseling
3. Evaluation of trainee progress and achievement
4. Selecting learning materials and hardware
5. Maintaining equipment
6. Replenshing expendable learning materials
7. Developing and validating learning materials (optional)
8. Promoting center offerings
9. Maintaining center relations with organizations using its services
10. Testing trainees
11. Maintaining records
12. Periodically conducting group instruction
13. Helping trainees use the facility[17]

In a small center, it may be possible for these functions to be performed by one professional and one clerical employee, supplemented by part-time help (e.g., for equipment maintenance or learning materials development). In a large center, several professional, clerical, and technical personnel might be needed to carry out all functions effectively.

It is essential that all staff be well qualified to perform the duties assigned to them. For example, the manager-coordinator of the center and other personnel who counsel trainees, or develop course materials, or make decisions about program acquisition or development, must be Employee Development Specialists or Education Specialists who are professionally qualified. They must be familiar with learning theory and its application; they must have knowledge of adult education processes and adult counseling techniques; they should be knowledgeable in the technology of individualized learning; and in evaluating the training process.[18] If the center develops its own materials, the courseware developers should be competent in instructional design and validation processes. Competent audiovisual personnel who can assist course developers in making effective use of audiovisual media are also desirable.

Quantity of Center Staff

The precise quantity of staff members will vary with the needs of the Center. The number of center employees will depend on these factors:

1. size of center enrollment;
2. attendance patterns of learners;
3. instructional level of trainees;
4. types of instructional materials (off-the-shelf or in-house);
5. roles and qualifications of staff;
6. and type(s) of instructional program(s).

The proper mix of professional and non-professional employees cannot be totally determined by formula. Figure 6 makes an attempt to show the possible relationship of employee mix.[19] It should be noted that the non-professional staff does not

Staffing Needed According to Number of Trainees in Attendance[1]

Number of Carrels or Trainee Spaces Available At Any One Time In a Center[2]	Number of Trainees at Various Rates of Space Utilization			Staff Needed Per 8-Hour Day[3]	
				Professionals	Non-Professionals
	100%	75%	50%		
12-14	96-112	72- 84	48- 56	1	1
25-28	200-224	150-168	100-112	2	1
38-40	304-320	228-240	152-160	3	2
50-55	400-440	300-330	200-220	4	3

Figure 6

[1]Adapted from Dr. John Peters and Dr. Curtis Ulmer, *How To Make Successful Use of the Learning Laboratory*, (Prentice-Hall, Englewood, N.J. 1972) Page 15.

[2]Most Government centers, though rather small in actual size, service large numbers of trainees. This is accomplished by admitting trainees to the center in small groups throughout the work day. Using this method, less staff are required to meet the needs of large numbers of trainees.

[3]For a twelve-hour operation, add the equivalent of one-half time staff position to each category.

increase in proportion to the number of trainees in attendance at the center. This is due to two factors relating to instruction and administration of a center. The demands on the manager's instructional time will increase proportionally with the number of trainees. The demands on clerical time and other duties will increase, but not in direct proportion to the increase in attendance. As the number of students increases the coordinator(s) will be required to give more time to individual counseling, individual referral, instructional and program design, evaluation, and general administration. The workload in these areas must be divided among the staff in order to keep efficiency up and costs down. Though there will be more record-keeping, phone calls, and maintenance problems, these may be handled by existing staff.

As the center increases in size, consideration must be given to increased efficiency and the maintenance of the individualized instructional approach. As the center becomes larger, consideration should also be given to reorganizing the administrative structure. Instructional teams could be formed which will have certain trainees reporting to them. Such a team may consist of a coordinator and a non-professional. The team could operate very much as the small center staff operated, but with administrative coordination by the center manager. Another possibility may include satellite centers coordinated by an area manager.

The primary role of the staff involved in a center is to give individual attention to individual trainees. This concern must be paramount no matter what the form of organization or the number of staff members.

Trainee working with a programmed text book.

Scheduling

Scheduling of center activities for efficient utilization of time and space can be of major concern if it is not carefully planned. Generally, the center should be open during convenient hours. This includes normal working hours and before or after working hours. According to Federal government regulations, no premium pay can be paid to an employee while in training except under special circumstances (see FPM Chapter 410, Subchapter 6-2b). Students should be encouraged to voluntarily use the center during non-working hours, but it must be made clear that such participation at that time is not mandatory.

Basically, a center may conduct two types of training - (1) job-related training and (2) self-enrichment training. If its mission permits, the center schedule should accommodate these two types of developmental needs to the extent possible. Self-enrichment activity, by its very nature, would normally be a voluntary, off-the-clock activity. Job-related training is generally an on-the-clock activity. Job-related training could, however, be an off-the-clock activity if attendance is clearly voluntary.

With the implementation of flexible working hours ("Flexitime") in some Government agencies, the center may have unusual scheduling demands made upon it. Consideration should be given to employing adequate staff so that activities may continue, uninterrupted, throughout the available period. Again, for scheduling reasons and convenience of those utilizing its facilities the center should be placed close to the work area.

Records Maintenance

Maintenance of records for the evaluation of center activities should be done on a regular basis. Records should be kept in these areas:

1. trainee progress;
2. load on equipment and facilities;
3. load on courseware;
4. and staff workload.

It is important to recognize trainee achievement. It has been shown that positive recognition of trainee performance helps raise morale and encourages continued good performance. Pertinent data should be maintained on trainee progress in order to serve various purposes.

1. Records will help the trainees evaluate their own progress.
2. Records will help the center in its general evaluation of center activities.
3. Records will provide information for the train-

ees' personnel files on completion of course information. In the individualized learning mode a course may consist of various units or lessons. These units may be taken at various times. A record of those units completed may be kept in the individual's training file. Upon completion of the required number of units for a course, a course completion certificate should be entered in the trainee's official personnel file and a copy should be given to the trainee.

A note of caution should be made in regard to maintaining the privacy of trainee records. The Privacy Act of 1974 was enacted to give individuals the right to review records about themselves that are maintained by agencies and to prescribe rules for the collection, use and exchange of information about individuals. The Civil Service Commission has developed regulations that govern the establishment, maintenance and use of personnel records and files for which the Commission is responsible (FPM 297-1). The Commission has also published notices of its system of records and the CSC/GOVT-3 system of General Personnel Records which includes information regarding training files (Federal Register Vol. 40 No. 226 November 21, 1975). These regulations prescribe basic principles and procedures for the protection of individual privacy in regard to personnel records and files maintained within the Federal Government. Individual agencies have the responsibility to create procedures for maintaining records within their agency in respect to the privacy of individuals. Once the records are transferred to the official personnel file the regulations as set forth by the CSC take effect. Agencies should make a careful determination as to the information kept on individual trainees and should be careful to secure all trainee records so that the privacy of individuals is maintained.

Maintenance of records on equipment is also important. In Appendix II of this booklet appear sample record maintenance forms. Use of these records may show that there are certain peak hours that occur during the working day when demands are placed on the total center which become difficult to meet. The careful keeping of usage records may help identify and alleviate some of these problems. Equipment and software will invariably malfunction; recordkeeping should indicate these problems and help solve regular maintenance problems.

Cost Considerations

Controlling instructional costs — capital, operating, development, personnel, etc., is a real consideration in the design of learning centers. Cost control and planning center objectives and activities are interdependent. The budget merely reflects a consolidation of the program plan as represented by the identification of dollar cost estimates for that plan. Therefore, before the budget is developed the center planner must determine both the short term and long term objectives.

In determining financial requirements for equipment, facilities, and manpower, the planner should consider three factors:[20]

1. **Acquiring and/or developing the resources.** This includes acquisition costs for instructional equipment, support equipment, facilities, and the design and development and/or purchase of courseware materials. Development costs will include personnel pay and allowances.
2. **The investment they represent.** This will include the per student cost and the potential for future utilization of the courseware and equipment.
3. **Operation and maintenance costs.** Included here are the costs needed to keep equipment, courseware and facilities up to established standards.

Research in the private sector, universities, and public schools has shown that implementation of the learning center concept can produce equivalent or improved performance at a lower cost than more conventional modes of instruction. These reduced costs are evident in several areas:

1. Capital investment
2. Instructional materials
3. Operating costs

1. **Capital investment.** Initially the capital investment to develop a complete learning center may seem high. This will be due to the number of instructional machines, room furnishings, and remodeling expenses. Many of these purchases represent relatively fixed assets (which may be amortized over a short period of time).

2. **Instructional materials.** The development and the production of in house instructional materials are a major factor influencing the effectiveness of learning center programs. At first glance, local production may appear to be considerably more expensive than commercially available materials. Commercially produced instructional materials which are not specifically designed for Government or a particular situation may be more costly in the long-run in terms of the quality of student learning and the future work efficiency of the trained employees. On the other hand, locally produced materials may be

more effective and efficient as instructional materials, but such factors as development time, revision time, production scheduling, and production volume may offset the advantages gained.

It should also be noted that careful analysis is needed to determine the best course of action. The per-item cost of instructional materials will be lower in an individualized learning center as compared to a conventional classroom teaching situation if there is high utilization volume, lower instructor-student contact time, and increased student progress and/or proficiency.

3. **Operating costs** - these are costs other than instructional materials costs and fixed costs (capital investment costs). Operating costs (salaries, expendables, maintenance, etc.), will be less in a learning center than what would be required to support conventional instruction for the same size population (assuming greater utilization of materials, equipment and less instructor/student contact time). These savings will be evident in several areas, but most prominently in the area of the requirement for instructional staff. Reductions in instructional staffing costs will be found to be of two types — reduction in the actual number of instructor-student contact hours, and a shift in the requirements for the kinds of talents required to support instruction in the learning center.

   a. The reduction in instructor-student contact hours will be due to increased reliance on various multi-media modes in lieu of reliance on the instructor. This reduction in instructor-student contact hours does not necessarily mean the elimination of all instructor positions, but it does mean that the instructor's role will change. The instructor's role will become that of manager of instruction, counselor, and curriculum developer.

   b. The second method of personnel savings will be found in the use of different types of qualified personnel to perform many functions normally performed by instructors. Those individuals will be qualified to perform specific functions e.g., pre and post-testing. These types of personnel will often be classified at lower grade level than conventional instructors.

Budget Worksheets

Careful planning through the use of budget worksheets will be helpful. The budget worksheet should include statements of center objectives. The proposed budget should then support those objectives. A breakdown of costs will include costs in the general area of:

1. **Direct Costs** - these costs generally consist of standard operating costs i.e., personnel, maintenance, new equipment, new software purchases, and replacement of equipment and software, (the latter items amortized over a period of time).
2. **Indirect Costs** - these will generally consist of facility rent and overhead based on a percent of the direct costs. Remodeling of facilities may be included here but usually this is included in the direct cost area.

Below is a sample budget worksheet which includes initial startup costs and annual operating costs for a typical twelve station learning center.

Estimated Startup Costs for a Theoretical 12 Station Learning Center*

	Estimated Startup Costs	Totals
DIRECT COSTS		
Staff		
Manager-coordinator		
GS-11 plus 8.6% benefits	$17,700	
Clerk-Typist GS-3 (includes 8.6% benefits)	7,700	
Total Staff		$25,400
EQUIPMENT AND FURNITURE		
12 Carrels	$1,800	
14 Chairs	800	
2 Desks	300	
2 Tables	200	
1 35 mm/Sound Slide Viewer	200	
3 Taperecorders	500	
3 Slide projectors	500	
1 Programmed Teaching Machine	1,300	
5 Headsets	100	
3 Typewriters	1,200	
3 Furniture - Lobby	800	
1 Controlled Reader	600	
Bookcases	1,000	
Total Equipment and Furniture		9,300
REMODELING		
Soundproofing	$2,000	
Carpet	2,200	
Total		4,200
COURSEWARE		
20 Programmed Texts	$500	
5 Audio Cassette programs	1,000	
15 Programs-Teaching & Reading	3,000	
10 Slide/Tape programs	2,000	
Total Courseware		6,500
Total Direct Costs		$45,400
INDIRECT COSTS		
Facility Rent (1600 sq. ft. & $10)	$16,000	
Overhead (50% direct)	22,700	
Total Indirect Costs		$38,700
TOTAL ESTIMATED STARTUP		$84,100

*NOTES:

1. These budget figures are based on costs as of January 1976.
2. The above example is presented for informational purposes only. All cost figures have been rounded. The reader is cautioned not to duplicate the above in another situation as objectives and circumstances vary with each agency.

Estimated Typical Year of Operation for a Theoretical 12-Station Learning Center*

	Estimated Operation Costs	Totals
DIRECT COST		
Staff	$25,400	
Equipment and Furniture		
—Allowance for depreciation of original investment	1,860	
—Allowance for depreciation of new equipment purchases of $2000 (new equipment for expansion center. This expense will vary with planned center utilization and expansion)	400	
—Maintenance of equipment and furniture	700	
—Replacement of equipment and furniture (This cost will be relatively low during the early years of operation but will increase as operations continue)	500	
Remodeling		
--Allowance of depreciation of original investment	840	
Courseware		
—Allowance for depreciation of original investment	1,300	
—Allowance for depreciation of new courseware purchases of $3000 (New courseware for expansion of the center offerings and keeping abreast with the state-of-the-art. This expense will vary with planned usage and expansion)	600	
—Maintenance of courseware	100	
—Replacement of courseware (This cost will be relatively low during the early years of operation but will increase as operations continue.)	300	
TOTAL DIRECT		$32,000
Indirect Costs		
Rent	$16,000	
Overhead (50% direct)	16,000	
Total Indirect Costs		$32,000
TOTAL COSTS OPERATION YEAR		$64,000

*NOTES:

1. It will be noted that equipment, furniture, remodeling costs and courseware, has been amortized over a five year period. This figure represents the usual life of most audiovisual equipment before replacement is found necessary. Some items, of course, will last much longer depending upon usage.
2. The above example is presented for informational purposes only. All cost figures have been rounded. The reader is cautioned not to duplicate the above in another situation as objectives and circumstances vary with each agency.

Amortized Trainee Cost Per Hour in a Theoretical 12-Station Learning Center

Rate of Utilization[1]	Cost/Trainee Hour[2]
100%	$2.56
75%	3.20
50%	3.84
25%	4.48

[1]The 100% rate of utilization has been based on a 8 hours per station per day during one fiscal year.

[2]For the purpose of comparison, note these costs per trainee hour, derived by the U.S. Civil Service Commission, Bureau of Training for 1976 data:

SHORT-TERM TRAINING, FY 1976

Government: Agency—Internal	$6.10 per trainee hour
Government: Interagency	5.05 per trainee hour
Non-Government	4.50 per trainee hour

Scheduling of center activities and trainees for efficient utilization of time and space.

Evaluation

It cannot be stressed too strongly that those centers found to be most effective over a long period are those in which periodic evaluation takes place. Although evaluation can be viewed from a number of different angles, in this section we are concerned with evaluation of the center or major parts thereof, and evaluation of individual trainees. Evaluation is the systematic process of determining the extent to which center objectives are being achieved. The evaluation process must start before the first "test" of center activities begins. That is, evaluation should be "built-in" at the time the center and the courseware are either designed, produced, and/or purchased. The evaluation process must be one of the steps in the total planning of the center. In evaluating individualized learning center activities one must return to the original objectives of the center.

The systematic process of evaluation consists of three basic steps.

Step 1. The identification and establishment of training objectives.

Step 2. The determination of standards of quality. The determination of what is to be considered acceptable achievement on the part of the trainee (and the center program); the standards of training performance.

Step 3. Systematic evaluation. The determination of whether standards are being met, which equates to (a) construction of instruments for assessing trainee and center progress, (b) periodic administration of these instruments, (c) analysis and interpretation of data obtained, and (d) feedback of results for use in making needed course and program adjustments.

The center management should carefully analyze and evaluate the results of those learning activities provided in the center to determine if the programs are contributing effectively to the achievement of the center mission and the attainment of center goals and trainee objectives (see Appendix IV and V). Evaluation should be conducted in a manner necessary to provide valid data for:

1. Assessing the extent to which the individual programs and trainees are achieving their intended objectives;
2. Guiding efforts to increase value and benefits of current programs;
3. Insuring that center resources are utilized economically and effectively;
4. Assisting management in the determination of center and student needs, establishing priorities, allocating resources and planning for future activities.

Of course, one should not neglect evaluation of the trainee. Again, the process for trainee evaluation begins with the original learning objectives. A truly individualized approach will establish objectives and learning experiences specifically for the individual trainee based upon previous knowledge, skills, and abilities as well as job requirements. Thus, the trainee will be evaluated on the basis of specific, well defined objectives. The individual's proficiency will be measured against a predetermined set of criteria, rather than its relationship relative to the performance of other trainees. Thus, the goal is not to differentiate among trainees, but to raise each individual's performance to the level specified as acceptable by the objectives. As a result of this evaluation the trainee and the training institution will know exactly those areas of instruction which were not effectively learned and which should be reviewed.

Evaluation should be a continuous process. Its goal is the early identification and prompt correction of deficiencies as they arise during the learning process. Continuous monitoring is necessary because even the most thorough planning represents an estimate.

Summary

The use of the technology in education and training that has been developed over the last three decades can increase learning options and permit trainees to find their own direction more easily. The lessons learned from the mistakes of the past can help us develop educationally effective learning systems and environments for the future. The traditional rigid control and standardization of what students learn, who, when, and at what pace they learn is no longer acceptable in certain situations. Different combinations of teachers, trainees, materials, space, time and dollars can respond more to actual learning needs. The knowledge, experience and technology to effectively implement modes of learning designed for the individual Government trainee exists.

The variety of educational objectives and the numerous means available to reach these objectives must be recognized. Where instructional alternatives can be offered to the individual trainee there can be more hope for successful training. An individualized learning center is one environment which can provide such individualization of instruction.

Footnotes

1. In government or industrial training situations the trainee must learn things to meet organizational needs. Generally, within the context of job needs or organizational needs, the trainees may set their own objectives.
2. *Individualization in Schools - The Challenge and the Options* (Washington, DC: National School Public Relations Association)
3. Kenneth Weingasten, *Utilizing Peer Instruction* (Conarac Training Workshop, October, 1971) IV13, IV14
4. The Office of Agency Assistance and Resource Coordination of the U. S. Civil Service Commission's Bureau of Training can make its services available for guidance and assistance to Federal, State and local government agencies. It is located a 1900 E Street NW, Washington, D.C. 20415.
5. U. S. Civil Service Commission, Bureau of Training, *Application of a Systems Approach To Training: A Case Study*, Training Systems and Technology Series: No. II (Washington, D. C.: Government Printing Office, 1969)
6. U. S. Civil Service Commission, Bureau of Training, *Visual Materials: Guidelines for Selection and Use In Training Situations*, Training Systems and Technology Series: No. VI (Washington, D. C.: Government Printing Office, 1971)
7. It is recommended that written comments accompany the unwanted materials in order to help the producer improve the product.
8. Several successful centers have been organized on a national basis. These centers consist of a network of smaller regional centers. The regional centers are then divided into still smaller local centers. Again, it has been found that the center should be located within easy access of the student population. The reader is referred to the Postal Service, Bethesda, Maryland 20014.
9. Ronald Spangenberg, "Human Factors in the Design of Carrels for Learning: State of the Art," *AV Communications Review*, Vol. 23, No. 3, Fall 1975, p. 305- 332.
10. Joseph De Chiara and John H. Callender ed., *Time Saver Standards for Building Types*, McGraw-Hill Co. N. Y. 1973 p. 225
11. Most centers do not have such facilities located on the premises, as they are often done in the "central" office.
12. *Academic Building Systems: Environmental Study Vol. I*, Educational Facilities Laboratories, Inc. N.Y. July 1971, p. 49.
13. *Ibid.* p. 46
14. DeChiara and Callender, Op. cit, p. 123.
15. Waldron Faulkner, Architecture and Color, Wiley Interscience, N. Y. 1972 p. 24.
16. EIAJ-1 stands for the electronic standard developed and approved by the Electronics Industry Association of Japan. This standard is only for ½" videotape recorders.
17. Dr. John Peters and Dr. Curtis Ulmer, *How To Make Successful Use of the Learning Laboratory*, (Prentice-Hall, Englewood, NJ 1972), Chapter 1.
18. It would be preferable that the manager-coordinator be experienced with adult learning as well as operation of a learning center.
19. Peters and Ulmer, op. cit., p. 15.
20. *Handbook for Designers of Instructional Systems Vol. IV*, Department of the Air Force, AFP 50-58 Washington, D.C. 1973 p. 6-3.

Appendix I

Planning the Facility Design; A Sample Set of Specifications

A statement of objectives based on recognized needs is essential if a learning center is to serve the purposes for which it is to be designed. Defining the requirements for a facility can be time consuming and often frustrating. Those who believe that blueprints can be drawn and construction started before adequate detailed planning, have a shortsighted approach that may inevitably lead to a poorly designed facility.

Six major factors must be considered in working out the details of a facilities design:

1. spatial relations: size and relationship of spaces;
2. aesthetic value: the use of color and design to create an attractive and beautiful environment;
3. visual environment: balanced lighting of chalkboards, desks, and work areas, and provision for darkening rooms if necessary;
4. noise abatement, within rooms and between them;
5. cleaning, plumbing, and sanitation;
6. and thermal comfort: temperature and humidity control, and ventilation.*

* J. Sutherland Frame and John W. McLeod, *Buildings and Facilities for the Mathematical Sciences*, Conference Board of the Mathematical Sciences Washington, D.C., 1963, p. 46.

In designing the space for learning centers care should be taken to consider these six design factors as well as the educational objectives and budgetary constraints. It is suggested that an educational architect, educational interior designer, or some other knowledgeable consultant be retained for the purpose of drawing plans and specifications to fit the particular requirements.

The example below indicates the end result of planning for the needs and design requirements of a small learning center.* The statements below indicate the rough facility needs which are transmitted to the architect, interior designer or consultant.

Critical Needs

1. The individualized learning center is a center for self-paced individualized instruction and therefore **should** provide facilities for this type of learning.
2. Maximum trainee and instructor access should be provided.
3. The facility should be in close proximity to the center of trainee population.
4. Learning center activity should be monitored from one location.
5. Flexibility of furniture movement is important.
6. There should be a zoning of conflicting activities (small group, individualized areas, etc.).
7. The environment should be non-regimented and pleasant.

* Adapted from the unpublished study by, *Program: An Elementary School For Southwest Tucson*, by William Wilde and Associates Architects, Inc., Tucson, Arizona, 1973.

Operation

1. Trainees will study at carrels when doing individualized assignments.
2. Trainees will meet in small groups for interaction.
3. The center will have varied scheduling during 24 hour period.
4. A workroom for cataloging new materials is necessary.

Activity Zones and Groupings

1. Office space for director and various counselors is necessary.
2. Entry should be controlled by one entrance (fire exit to be included).
3. There should be no visual obstructions in study area.
4. A space for storage of materials/equipment is necessary.
5. A lounge area for waiting is necessary.
6. An area for reading of professional publications is desirable.
7. An area for checkout/in of instructional materials/equipment is necessary.

Other Conditions or Factors that Need Consideration

1. **People, provision for**
   a. Trainees
      10 students at one time in individual learning space

10 students at one time in small group study space

b. Staff
   - one manager-coordinator
   - one part-time counselor
   - one clerical employee

2. **Growth**
   Plan for doubling facility in next 5 years.
3. **Environment**
   Carpet all areas.
   Acoustical treatment throughout for low noise level.
   Pleasing varied colors in interior design.
   Lighting levels to serve functional areas.
   Air conditioning and ventilations with controls located in center.
   Acoustic tile ceiling-liftout type-on low ceiling
   Noise levels to vary with function of space.
4. **Furniture & Equipment are to include:**
   Central control desk for materials.
   Workroom area to have counter and cabinets above and below.
   Tables and chairs to seat 10 adult persons.
   Study carrels to seat 10 adult persons; all carrels to be "wet".
   Magazine rack in waiting area.
   Sufficient lounge chairs to seat five adults.
   Various AV devices.

Appendix II

(This sample maintenance form may be useful in maintaining records of equipment operation and repair. The form has been designed for printing on card stock for easy filing).

Side I

INVENTORY AND MAINTENANCE RECORD

MONTHLY MAINTENANCE PERFORMED

	1977	1978	1979	1980	1981	1982
JAN						
FEB						
MAR						
APR						
MAY						
JUN						
JUL						
AUG						
SEP						
OCT						
NOV						
DEC						

EQUIPMENT LOCATION:

PURCHASED FROM
COMPANY ADDRESS:

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Appendix III

Some Considerations for Determining Needs

The questions below are intended to help guide the Center planner in making an analysis of needs.

Some questions to consider for employees:

1. Will what is learned help employees in their immediate job or some future job?
2. Will the time taken for trainees' studies interfere with work schedules and loads?
3. Will what is learned at the center be valuable in advancing employee careers?
4. Are there instructional programs presently available to help meet employees objectives?

Some questions to consider for the organization:

1. Will a center fit the organization's training structure?
2. Will the center complement the organization's training objectives?
3. Are employees interested?
4. Will employees accept such a center and its mode of instruction?
5. What is the potential enrollment in the first year? subsequent years?
6. Are there centers nearby that could be used instead?
7. What job classifications and grades need training?
8. Is a learning center the most effective means of teaching people in these categories?
9. Will the center teach skills, knowledges, or both?
10. Can center activities be scheduled only during the work day?
11. Will the schedule increase employee production and reduce the amount of time the employee is away from the job?
12. Is a suitable facility available for the center or will it be necessary to build?
13. Is the training staff qualified to operate a center?
14. Can the organization afford a center and continue its operations?
15. How effective is the present mode of instruction?
16. Are there instructional programs presently available to teach the objectives of the trainee?
17. Must instructional programs be designed to teach the required knowledges and skills?
18. Can upward mobility training requirements be accomplished?

Appendix IV

Manager-Coordinator's Checklist of Tasks for Evaluating Learning Center Operations

This checklist contains questions touching on many aspects of effective planning and operation of an individualized learning center. It may be used as a guide by the Manager-Coordinator to evaluate center operations. It is by no means a substitute for carefully designed evaluation instruments specifically meant for a particular center. It may also be used to diagnose specific problems with ineffective systems.

Aspects of the Learning Process	Questions to be considered by the Manager-Coordinator
Objectives Identify and define objectives in terms of desired changes in behavior or activities.	a. Were complete center objectives determined in the initial planning stages of the center? b. Were center activities, learning program, administration, funding, etc. carefully planned and objectives determined for each? c. Were the needs of the trainee population determined and were carefully defined objectives based upon those needs determined?
Facilities Plan and direct learning experiences in harmony with stated objectives.	a. Do center facilities and equipment meet the objectives of the individual trainee? b. Do center facilities meet the objectives of individualized instructional techniques? c. Does the center budget meet the needs of the center and its objectives?
Courseware	a. Does courseware design and method of presentation meet the objectives and needs of the trainee population? b. Is there enough variety of courseware materials and equipment in sufficient quantity, to meet the objectives of the center?
Personnel	a. Are center professional personnel selected on the basis of qualifications for training in an individualized learning situation? (Other qualifications such as personal qualifications, prior experience, etc. should also be considered). b. Do center personnel meet the objectives of the center and of the trainee population?

Evaluation

Determine trainee and center progress toward meeting objectives.

a. Are specific evaluation instruments designed and implemented to test the objectives and efficiency of the courseware, center programs, center personnel and students?
b. Are all aspects of the center (facilities, equipment, personnel, policies, budget, administration, etc.) evaluated?
c. Are there a variety of evaluation techniques available i.e., testing, interviews with trainees and staff, questionnaires, observational reports?
d. Has consideration been given to the feasibility of utilizing an outside agency to perform center evaluation?

Feedback

Use results of evaluation to improve student learning and center activities.

a. Has determination been made that all center programs and activities are meeting continuing needs of the trainees and of the center objectives?
b. Does the center determine how its activities may be modified for improvement?
c. Based on the evaluation, does the center determine what further objectives should be set and what plans should be outlined to meet those objectives?

Appendix V

Checklist for Trainees for Evaluating Individual Progress in an Individualized Learning Center

Aspects of the Learning Process	Questions to be considered by the trainee
Objectives Identify and define objectives in terms of desired changes in behavior or activities.	a. Were careful diagnosis of your needs made at the outset of the program? (Is there a pre-test procedure)? b. Have you determined your objectives, long and short term, career based, upon your needs? c. Has an Employee Development Plan been agreed upon by you and your supervisor?
Learning Experience Plan and direct learning experience in harmony with stated objectives.	a. Was the learning program designed to meet predetermined career objectives? b. Is guidance and counseling given in order to plan individual learning programs? c. Have you been guided as to the use of individualized materials and facilities found in the center which satisfy your needs? d. Do courseware materials have specific objectives matched with your career objectives?
Evaluation Determine trainee's and center progress toward meeting objectives.	a. Will you be evaluated in terms of meeting previously stated objectives? b. Was evaluation accomplished using various techniques i.e., tests, self-reports, observations, etc? c. Was the courseware evaluated in terms of your objectives? d. Was the courseware validated before it is used in the center?
Feedback Use results of evaluation to improve student learning and center activities.	a. Are you given the opportunity to decide if the original objectives should be revised after the change in behavior gained from learning programs? b. Do you receive guidance as to further study in or outside the center? c. Do you have the opportunity to acquire new knowledges and skills as a result of training and previous evaluation processes?

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INDIVIDUALIZED INSTRUCTION: ESTABLISHING AND OPERATING A CENTER FOR SELF-PACED LEARNING

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